ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 6.] [1908.

XXXI.—THE SOUTHERN ISLANDS EXPEDITION.

The expedition, undertaken by New Zealand scientists, to the Auckland and Campbell Islands, which left New Zealand on November 14th, 1907, returned in safety at the beginning of December. It was carried out by the Government, with the advice of the Council of the Canterbury Philosophic Society, and appears to have met with considerable success, as will be seen from the following accounts :—

DR. L. COCKAYNE, Naturalist of the Expedition, communicated an account of the Islands to "The Lyttelton Times," of November 6th, 1907, part of which is here reproduced.

"Rising out of that vast expanse of stormy ocean which surrounds the iceclad Antarctic continent are several small groups of islands, tiny specks indeed upon the map. The principal of these—the Falklands, South Georgia, the Crozets, Kerguelen Land and the southern islands of New Zealand—though at most mere names to the majority, are of surprising interest to the scientific, presenting as they do many problems for elucidation, full of fascination but of extreme difficulty. Of greater extent, but having many biological features in common with the above, are Tierra del Fuego and South America west of the Andes as far north as and including the Chronos Archipelago.

"Now, although in the Northern Hemisphere, a fairly abundant vegetation of flowering plants exists beyond the Arctic Circle, the Antarctic is practically without plant-life except seaweeds and a few mosses and lichens; the above-mentioned islands, though lying for the most part at the same distance from the equator as Great Britain, marking, with a few trifling exceptions, the southern limit of the higher plants. Still more remarkable is it that, though separated from one another by thousands of miles of ocean, they have no small number of species in common. The earthworms of our southern islands are closely related to those of Kerguelen Land and Fuegia; the wet coastal rocks of Antipodes

1375 Wt 35 6/08 D & S 29 32551

and Marion Islands are equally adorned with the succulent, reddish masses of *Crassula moschata*, and the tender green feathery-leaved *Cotula plumosa* equally delights the eye both on the Crozets and the Aucklands, while the huge cushions of that remarkable plant of the carrot family, *Azorella Selago*, defy the constant Antarctic gales of both Kerguelen Land and the Macquaries. Until quite recently it has been the habit to speak of the fauna and flora of the above islands as Antarctic, but this quite evident misnomer has recently been changed to sub-antarctic, since their biological conditions have nothing analogous with those of the Arctic, and also are very different to what is found at similar latitudes in the Northern Hemisphere. So far as the New Zealand subantarctic region is concerned, there are six groups of islands, of which the Aucklands are by far the largest. The following are their names, distances and direction from the South Cape of Stewart Island :—

"The Snares, sixty miles S.W.; the Aucklands, 190 miles S. by W.; the Campbells, 330 miles S. by E.; the Antipodes, 490 miles E.S.E.; the Bounty Islands, 490 miles E.; and the Macquaries, 570 miles S.W. by S. These latter have an anomalous position, as they belong politically to Tasmania, but biologically to New Zealand.

"It was trade and not science which first made these remote portions of our dominions famous. Where the waves break over the jagged rocks was a countless host of fur seals, now, alas! all but extinct. For years small sailing craft, manned frequently by Stewart Island Maoris, visited their shores, riding secure in the fine harbours of Auckland or Campbell Island, or landing parties on the shining granite rocks of the Bounties or the tussock-clad Antipodes. The havoc wrought amongst the seals was almost incredible; for instance, the story goes that one ship alone landed 100,000 skins at the Antipodes. A quite remarkable incident in the history of the Aucklands was the Enderby Settlement, a grant of the islands being made to Messrs. Enderby, who established what was known as the Southern Whale Fishery Company. For some years, 1850–1852, a population of 300 Europeans and Maoris lived at the north end of the main island and on Enderby Island, braving the inhospitable climate, but, as the venture was a financial failure, the settlement, from which great things were expected, was abandoned.

"With the decline of whaling and sealing, the non-scientific interest in the islands would have ceased, had it not been for the fact that their iron coasts lay right in the track of sailing vessels by the Cape Horn route to Europe. Consequently, as might well be expected, many shipwrecks have taken place, the barren shores and fantastic forests being silent witnesses of frightful sufferings and no little splendid heroism. One example alone can be here briefly touched on. The Grafton, a small sailing vessel of seventy-five tons, was wrecked in the land-locked Carnley Harbour. Officers and crew, five in all, landed safely and lived at the south end of Auckland Island for a year and a half. Finally, however, seeing no hope of escape from a most miserable life, the ship's dinghey was mended, with what makeshift tools they possessed, and in this most crazy craft Musgrave, the

captain, Raynal, the mate, and one of the crew started out on what must have looked the most hopeless of forlorn hopes to brave the tempestuous two hundred miles of heaving waters separating them from Stewart Island, which place, marvellous to relate, they gained in safety. This most daring need roused the enthusiasm of Invercargill, whose people equipped the Flying Scud and rescued the two sailors left behind.

"The case of Musgrave and his crew aroused the public from its apathy, so that first the Victorian Government steamer visited the islands in 1865, while three years later the brig Amhurst examined all our southern islands for castaways. Later on, the New Zealand Government erected huts and boatsheds, providing abundance of food, clothing and bedding in the former and a boat in each of the latter. Each year, too, one or more trips are made by the Hinemoa, the Tutanekai, or a man-of-war to the islands, and more than once the first-named vessel has returned with rescued mariners."

CAPT. DORRIEN SMITH who was a member of the Southern Islands expedition has kindly permitted his Report to appear in the *Bulletin* and has also supplied the photographs from which the illustrations have been taken.

"The Lord Auckland Islands. Lat. 49.50 S.
"Nov. 26th, 1907. Long. 66.01 E.

"As a member of the Sub-antarctic Scientific Expedition, I left the Bluff, N.Z., with some two dozen other members, at 8·50 a.m. on November 14th, 1907. The Expedition which originated with the Canterbury Philosophic Society, a branch of the New Zealand Institute, was divided into two parties, half the members going to the Auckland Islands, the other half to the Campbell Islands. The primary object of the expedition was magnetic observation, in both groups of Islands. The other scientific branches included Botany, Geology and Zoology. The Government S.S. Hinemoa, Commander Captain Bellons, conveyed the party. At 2 p.m., 14.11.07, put in at Port Pegasus, near the S.W. extremity of Stewart Is. The whole party proceeded ashore, or in pursuit of fish. The harbour is very fine, and perfectly land-locked and a good anchorage. There are only a few rough shanties, and a fish-freezing works ashore, the place being used chiefly in the winter for fishing. A track through the bush leads across the island to Paterson's Inlet. The island is very rugged and covered with dense bush comprised of *Metrosideros lucida*, which is dominant and exceedingly gnarled and straggling. *Podocarpus Hallii*, *Dacrydium cupressum* and *D. intermedium* are very prominent, whilst *Panax simplex*, *Leptospermum scoparium*, *Veronica buxifolia*, *Dracophyllum longifolium* and *D. Pearsoni*, form the lower scrub. But the chief feature of the island plant-life is the wonderful moss cushions, the carpet of the forest appearing as if the whole was covered in boulders clad with moss, but in reality these heaps are solid moss and liverworts, whilst *Sphagnum* abounds in the bogs.

"The Tree Ferns, *Hemitelia Smithii*, are plentiful as well as Polypodiums, Aspidiums and other ferns too numerous to mention,

and over all is the death-like stillness of the forest, broken only by the occasional tinkle of the Bell Bird, sounding evensong, and the Tui or Parson Bird. The large Kiwi, called the Roa, is apparently still abundant, judging by the bore-holes seen, and the Weka or Woodhen, looking like a large Water-rail, are very numerous, and also inquisitive for they come within easy reach and may be caught with a landing net. On return to the ship, about 7 p.m., we found that those interested in the study of fish had caught some fine flounders and blue cod which we ate for breakfast the next morning. Weighed anchor about 9 p.m., and steamed under easy steam to the Snares Islands where we arrived on the morning of the 15th, in thick weather. These islands are composed of basalt, rising some 500 feet, with precipitous cliffs. Except on the Eastern side, where there is a convenient inlet which makes an excellent landing-place, the whole island is covered with dense semi-prostrate scrub, composed of *Olearia Lyallii* and *Senecio Muelleri*; the former with its silvery foliage is easily distinguished from the vivid glossy green of the latter. On the edge of this scrub, and along the cliff, grew the long coarse grasses *Poa littorosa* and *P. foliosa*, and mixed with them is *Veronica elliptica* and a plant which resembles in foliage a vegetable marrow, but in reality is *Stilbocarpa*, the flower of which, although green and black, forms a fine head, and is certainly worthy of a place in a garden. Dr. L. Cockayne whom I have been with, and who is the chief Botanist on the expedition, has pronounced it a distinct species from that growing on Auckland Island and named it *Bollonsi*, in honour of the commander of this vessel. In all there are about 13 species of plants on these islands only, but the bird life is wonderful. On approaching the shore dense colonies of Penguins were seen, and a few Terns and Gulls flying about. We found the landing place fully occupied by sea-lions, some of which were inclined to be truculent, and charged down the steep slope towards the sea scattering the party right and left, over which there was much merriment mingled with a certain amount of fear for he can bite to some purpose if he chances to get an opportunity. My main object in landing on this occasion was not so much to hunt plants as to catch the many flightless birds, and this to me was of great interest, I had provided myself with a long-handled landing-net and a sack for the purpose; the idea being to transport the birds (land) when caught to the island named Kapiti, in Cook's Strait, which is held among other islands, by the Government, as a reserve for native birds and plants; which precaution is becoming every year more necessary, since the native birds are fast disappearing. The first bird I saw was a brown fern bird, about the size of a hedge sparrow, but with a fan-shaped tail, and I found them great experts in escaping capture, but with the aid of four Maoris whom we had brought with us, I rounded up the birds and then caught them in the landing-net. These and the Snipe, which in marking is very similar to our British full Snipe, but is much more sturdy in legs and bill, and has a much shorter tail, were comparatively easy to capture, but the Chatham Island Robin, which although tame could fly, and was just wary enough to keep out of reach, was much more difficult to catch, but we managed to secure a few. Our labours were all in vain, however

as they have all since died. The Snipe lived six days, and fed on worms easily and greedily, but it seemed to me that the cold weather experienced in the Auckland Islands finished them off. Skuas (Cape hens), Mollyhawks and Petrels abounded ; the latter underground with the Mutton birds and Whale birds uttered weird gurglings in the bowels of the island. We left the islands in thick weather, in the evening, and steamed easily about 150 miles further South, to the Auckland Islands, which we made the next morning about 5 a.m., Nov. 16th, in thick drizzling weather and a moderate sea. Our first port of call was Port Ross, on the N.E. side of the island ; and at the head of it flew a dirty rag on a pole and presently the beach became alive with men. They were a shipwrecked crew. I must here tell you that the New Zealand Government provide provision depôts, boats and sheds on all the Southern Islands, and this vessel goes once in six months to examine them, and for this purpose we visited Port Ross, a great arm or fiord stretching into the heart of the island, and overlooked by heights 2,000 feet high, in dense foliage up to 600 feet, and then a low scrub, till the grass line is met at 800 to 1,000 feet. The ship's boat was launched and Captain Bollons went ashore, and soon came with the news of the wreck, and four of the men themselves rowed off in the Government boat, to get more provisions from our vessel, as they had nearly exhausted the store ashore. The four-masted barque, Dundonald, bound from Sydney to England, with grain, went ashore at 12.30 a.m. on March 7th, 1907, on an isolated desert island, devoid of a depôt or boat, about five miles off the west coast of the main island. It was a pitch dark night with thick drizzling rain. The watch had just changed when towering cliffs were seen rising right above them. There was no room to wear the vessel, although an attempt was made, and she was driven smack into a cleft, in the cliff, with half a gale of wind behind her. Out of a crew of 27, there were 15 saved, and 12 drowned, including the captain and his son and most of the ship's officers. The only way of getting ashore at all, was by way of the mizzen, and so on to a ledge of the cliff, but the first man who attempted it, slipped on the cliff and was dashed to pieces on the rocks. The second man was more successful and got a rope ashore, and another man came after him, and they together managed to work round the cliff, and got a line aboard to the rest of the crew who were all assembled on the foc'sle. By this time the vessel was in two halves and some had been washed out of it and drowned, including the captain, his son and the chief steward. Eventually 16 got ashore, including the old mate, who got the line ashore originally, but who afterwards died of exposure, and was buried on the island. The crew lived on penguins and mutton birds, and various petrels and sea-lions for six months, and managed to make a rough boat out of bits of sail cloth, and trees cut down on the island, and in this, picking a calm day, four of them managed to find a landing on the main island (last October). The four then proceeded inland, to try and discover the provision depôt, which the old mate had told them existed on the east coast of the main island. They failed, however, and as their pot of fire had been swamped on landing, they were obliged to return whence they came ; after six weeks had passed and another boat had been constructed, three men set off and

landed again on Auckland Island. They wandered along the cliff for some time, until they came to a finger-post directing them to the depôt, to which they made their way, in spite of the dense tangled mass of undergrowth, and the fact that the only boots they had were made of sealskin, and their clothes were mostly of sail cloth. Having arrived at the depôt, they launched the boat there, and after provisioning it, they sailed and rowed round the north end of the island, and reached the north harbour, where they put in on account of bad weather; from there, watching an opportunity, they got back to the scene of the wreck on Disappointment Island, and in three trips brought the rest of the shipwrecked crew across to the main island. Landing on the western side, and walking overland, the boat was then sailed around again to Port Ross and so all the survivors were safely accommodated, after six months' fearful privations and suffering from cold, wet, and hunger. Wood was available in plenty but they could only muster two matches between them. With these they lit a fire, and kept it going, bringing it to the mainland in an old tin. When we rescued them they all looked very fit and well, and had had time to recoup after their terrible time on Disappointment Island. After taking on board one of the castaways to act as cook to the Campbell Island party, and after reprovisioning the depôt, we sailed south about 7.30 a.m., and proceeded down the coast to Carnley Harbour, which was the destination of the Auckland Island section of the expedition. Carnley Harbour is entered from the east, between the two fine heads, the southern of which is Adam's Island, separated from Auckland Isles by a narrow strait, which widens out into a mass of inlets penetrating Auckland proper. The western end of the strait is exceedingly narrow and only navigable at great risk, since the enormous send of the Southern Ocean breaks with great force against the entrance, which added to the tide rush through the narrows, creates a dangerous rip. The scenery is very fine, and the harbour magnificent. The hills rise abruptly to 2,000 feet. The Rata dominates the lower zone to 600 feet. Then comes the long Tussock grass, *Danthonia bromoides*, mixed with *Suttonia divaricata*, stunted Rata and *Coprosma*, to about 800 to 1,000 feet. This zone is known to us as the Suttonetum, and is almost impenetrable; it is luckily thornless. The *Danthonia* forming large tussocks grows its own peat, and where it is absent the bushes have grown in the shelter of the pits thus formed, and have had the effect of making the surface exceedingly rough and difficult to traverse. It resembles a succession of peat hags, and a fall off a *Danthonia* tussock means complete disappearance and much annoyance. But if this form of country is bad, perhaps the *Suttonia* scrub is worse, for matted together by the necessity of protection from the violent gales, it is about waist deep. There are three methods adopted for progressing you must either walk on the top, roll over the top, or crawl underneath. The two former methods were generally adopted. For example, it took four of us, two and a half hours to drop down a hill from 700 feet to sea level, and the distance was scarcely a mile. Our camp was fixed on a promontory forming the eastern arm of Camp Cove, where there was a depôt and boat shed which has been the home of many a shipwrecked mariner in the past, and no doubt will be again at no distant date,

for the wrecks are numerous. Attached to the Expedition was a whale boat, manned by five Maoris, and by this means we established flying camps to the various bays and inlets of the harbour, the main camp remaining at Camp Cove peninsula. For ten days we carried on explorations, the various parties scattering in pursuit of their particular interests. The island, geologically, was practically unknown, and in this branch many important discoveries were made; the Flora better known and studied by Hooker in 1840, and later by Kirk and Chapman, was also successfully exploited, and perhaps some 8 or 10 species previously unknown to the island will be added to the list. On this day, the 26th, the S.S. Hinemao returned about midnight, and we left Carnley Harbour for Norman Inlet about 5 p.m. and anchored there for the night; the next morning, the 27th, all went ashore at 4 a.m. This is a narrow, but deep inlet, and a boat is kept here for the use of shipwrecked crews. Close around the shed grows *Hemitelia Smithii*, the most southern Tree Fern known. At this point we were at no distance (some three miles) from the head of North Arm, Carnley Harbour. The heights between are about 2,000 feet high, and crowned by fine basaltic rocks, known as the Giant's Tomb and Flat-topped Hill. It was from the North Arm that we got our first view of the west coast of the island which is precipitous throughout its entire length with the exception of a small bay facing Disappointment Island, which was the place where the shipwrecked crew landed. The distance from North Arm to the West Coast is barely two miles, up a gentle rise, and there a magnificent view met us. The cliff at the place where we struck it was 780 feet sheer into the sea and on either side of us they rose to 1,400 feet. Close by was a waterfall which fell straight over the cliff, the water, however, never reaching the bottom in a flow, the wind scattering it and spindling it out into a thin mist. Then far away north we saw smoke and thought that the castaways had lit a fire but our glasses revealed three streams, endeavouring to reach the sea, but the winds cast it all back and blew it up the island again. In the N.W. loomed Disappointment Island and the pinnacle rocks of the N.W. Cape of the Auckland Island. After this astounding view, we all thought the wretched crew of the ill-fated vessel lucky in striking where they did, for had they missed it and gone on the mainland coast their chance of scaling the cliffs would have been very small indeed. After examining the plants, &c. in Norman Inlet, we sailed north at 8.30 a.m. for Port Ross. The sea was calm but weather overcast. After blowing our syren into two creeks, we made for Enderby Island, at the head of Port Ross. This island was formerly a whaling station, but with the extinction of the whale, the settlement died out also. It was started by Enderby in 1850, and cattle and goats are still fairly plentiful. We anchored off a sandy beach, on which were some forty sea-lions; a few were also on the high sand-dunes behind. Some of them were doomed to destruction as the zoologists required some specimens for the museums. The party therefore set out to the attack. A few clubs and a couple of rifles soon stretched out four; it was an ignominous proceeding as the sea-lions instead of trying to escape awaited the onslaught with a placid mind and were soon despatched. The next entertainment was the capture of flightless

ducks, for the purpose of taking them and introducing them on Kapiti Island, in Cook Strait. For this purpose Dr. L. Cockayne and myself, with a photographer, set off with Captain Bollons in a boat to Ewing Island, about two miles S.E. The birds were soon captured, but it required a good deal of activity. The ducks were first located among the boulders along the shore; the presence of the boat sent them up the bank and it then became a land hunt, the birds generally disappearing down a mutton-bird hole. The island was also very interesting from a naturalist and botanical point of view. The birds are, on all these islands, remarkably tame. The pipits, rather lighter in plumage than the English meadow pipit, the black and white robin, and the snipe seemed to constitute the land birds. The ground was honeycombed with the holes of the various petrels, and there was a large shag rookery on one of the headlands. These shags are about the same size as the common British shag, but have a white breast and bar on the wing, while the head and back and tail are dark but set with a very lovely sheen in various shades of green. The chief interest among the plants was the forest of *Olearia Lyalli* which covered the low island from one end to the other, and is particularly interesting since it is not found on the other islands of the Auckland Group, with the exception of a small patch on the main island, at Port Ross. I have already described it growing on the Snares, where, however, I was unable to get any seedlings, but here the floor of the forest was carpeted with young plants of all sizes. It appears that the Rata (*Metrosideros lucida*) and this plant do not agree, and that the Rata will swamp it out, hence its disappearance from the main islands. The clear places on the island were ocupied by *Poa littorosa* growing in large tussocks. Having caught a dozen ducks we returned to the ship and after collecting the rest of the party from Enderby Island, we steamed to a more favourable anchorage, close to the depôt where the castaways were encamped. The next day, November 28th, after putting a geological party ashore on Auckland Island, we weighed anchor at 6 a.m. for the scene of the wreck on Disappointment Island. This point of the expedition was one of the most interesting parts of all, not only from the point of view of the wreck, but from the fact that no scientists had ever been on it, and it was entirely unexplored, both botanically and geologically. The impression that it was covered with Rata was soon dispelled, for at first sight no bush was to be seen at all. We landed in a small and convenient rift in the rock, and saw up the hill a *Poa littorosa*, and a magnificent meadow of *Ligusticum latifolium*, dotted with thousands of penguins and mollyhawk, whilst in addition *Pleurophyllum speciosum*, *Stilbocarpa polaris*, *Veronica Benthami* and *Bulbinella Rossii* formed the chief vegetation of the island. The first object of interest was a kind of cradle made of crooked bits of stick, which we identified as constructed from the wood of *Veronica elliptica*. This was the framework of the boat constructed by the castaways by means of which four of them* reached the main island and discovered the depôts in Port Ross.

* [An article on the wreck of the Dundonald with various photographs, including one of the boat built of branches of *Veronica elliptica* will be found in *The Wide World Magazine*, May, 1908, p. 179.]

The canvas for the boat was obtained from one of the sails but long before the possibility of a boat was ever thought of, the men had cut it up to make shirts and trousers. So with needles made out of birds' bones and twine saved from the wreck, they laboriously sewed the canvas together, and after greasing it with seal oil, attached it to the rude framework. Whilst four of the men went to the scene of the wreck to fetch the body of the mate Peters, who had died from exposure, the scientists scoured the island, and visited the huts built by the castaways, in which they had lived six months. Built of peat and thatched with tussock grass, they made admirable shelters in which two or three men could sleep. For rugs the skins of the albatross and mollyhawk were adopted. The geologists here made important discoveries of ancient sedimentary rocks, thus adding another link to the already established theory of a great sub-antarctic continent, further proofs of which it was one of the main objects of the Expedition to discover. The geologists also made valuable collections of earthworms, woodlice, etc., identifying the same as identical with those of Kergulen and Fuegia. In a great measure also the plant life of the island goes to prove the existence of a sub-antarctic continent joined to that of New Zealand. The weather for these latitudes throughout the stay of the Expedition has been normal and perhaps finer than is usually the case. It has rained every day but never for the whole day, while the winds have been 'moderate to strong' from N.W. to S.W. The nature of the country is boggy peat, the steep ascents and thick scrub making it very difficult to traverse, except above 1,000 feet, then the ground becomes stony.

"On our leaving Disappointment Island, about 12 noon, we steamed in the Hinemoa south as far as Cape Bristow, and then up the western cliffs and round N.W. Cape back to Port Ross. All then went ashore at the depôt to bury the poor mate in the little cemetery, Captain Bollons reading the burial service, a most impressive scene, the tomb stones telling of untold suffering of mariners long ago, of the two men who died of starvation, of a child aged three months, and inscribed on a slate hanging on a stick 'Unknown.' The ceremony over we returned on board, and to-day the 29th, the morning broke clear and fine with an occasional shower and wind W. 'moderate.' The morning is being spent re-victualling the depôt and in magnetic survey. We sailed at 12 noon for the Bluff."

In "The New Zealand Times" for December 11th, 1907, DR. COCKAYNE gives the following account of the Snares, about which group less has been published than about the other islands :—

"The Snares consist of two fairly large islands and some rocks built up entirely of granite, the precipitous cliffs of which, especially on the western side, tell the story of a large land surface in the past. This conclusion, too, is amply supported by the botanical evidence, since the islands contain but 23 species of flowering plants and ferns, the sole survivors of a much more varied assemblage in the days gone by. As a land surface shrinks owing to well-known geological causes, the struggle for existence among its plant, and for the matter of that, animal inhabitants, becomes keener and keener and is intensified by climatic changes also,

which may assume such an intensity that only a favoured few possessing some peculiar advantage can subsist. Amongst these are frequently species not found elsewhere, and such havens of refuge are the happy hunting ground of the biological collector. The Snares supply their quota of evidence to this theory. Of animals peculiar to the group there is a dainty little snipe which lives amongst the grass tussocks, probing into the peaty ground with its long bill in search of worms; also a sprightly black robin and a fern-bird, these two latter flitting about amongst the *Olearia* trees quite without fear of human beings. The *Olearia* covers much of these islands with a sage-green mantle. It, like the rata, has a fan-spreading and prostrate trunk, which habit in this case is perhaps hereditary, since seedlings not exposed to wind at all show the same bending of the main stem at quite an early stage. Its leaves are large and thick and leathery, but especially noteworthy is their covering of white felty hairs on the under-surface, which not only renders them beautiful through the contrast afforded, but prevents them losing water too rapidly, a matter of much moment in a climate with fierce winds and a sour soil of peat. This tree is not peculiar to the Snares, but it is very rare, nevertheless, being found only on Ewing Island, of the Auckland group, together with a few trees at the end of the main Auckland Island. The matter is rather too intricate for discussion here, but there is reason to believe that the tree in question may have been a member of the now vanished and problematical forest of an ancient Antarctic Continent. Peculiar to the Snares, too, is a plant of the ivy family, which I am proposing to call after my esteemed friend, Captain J. Bollons, of the Hinemoa, who not only on the occasion of the sub-antarctic expedition but for many years past has done much to advance New Zealand natural science. The plant has very fine green leaves, resembling somewhat those of a vegetable marrow, given off from remarkably thick creeping stems, and it bears rather large, but by no means showy, masses of waxy greenish flowers. The genus *Stilbocarpa*, to which it belongs, is confined to our New Zealand sub-antarctic islands, and to Stewart Island and Ruapuke, and is also related to a foreign plant from which a product of commercial value called ginseng is produced. The Snares species was originally confused with the magnificent Chatham Island forget-me-not, a plant-geographical fact of great importance had it been true.

"Perhaps the most interesting matter regarding the Snares' vegetation is that the distribution of the plants is determined by the wind and by the presence of countless penguins and numerous sea-lions. With regard to the animal influence, it is hardly going too far to assert that the whole island is constantly being freshly manured by the birds, and that so far as the tussock meadow is concerned, portions are alternately being destroyed and renewed. The wind regulates the distribution of the plant associations. Where it is not too strong, forest, or perhaps I might term it scrub, can flourish, where stronger a luxuriantly growing grass called *Poa foliosa* is abundant, but in the most wind-swept spots this latter gives place to a tussock grass found in all other groups of the islands named *Poa scoparia*, whose slender hard leaves can better resist wind and allow much less evaporation than the broad ones of the first-named species."

In the same journal Dr. Cockayne gives a few general notes on the more remarkable plants and general vegetation of the southern islands, which are reproduced in conclusion :—

"First and foremost comes the meadow of stately, and for the most part lovely, herbaceous plants which at sea level on Adams Island, the most southerly of the Auckland group, and on the higher land of the islands generally, cannot fail to move admiration even in one knowing nothing of plants or of botany. Perhaps the monarch of the meadow is a majestic plant of the daisy family, belonging to a genus purely sub-antarctic, called *Pleurophyllum*, related to the asters, so well-known in gardens. The leaves are of great size and are corrugated. Their colour and general appearance somewhat resembles a pale green velvet or plush. The plants, with their huge goblet-like form are striking enough, but when the beautiful purple flower-heads are raised high in the air, dozens at a time, and side by side, they become a glory. There are perhaps three other species of the same family ; one with silvery leaves just tinged with green and dotting the upland meadows as far as the eye can reach affords a charming spectacle. With this as companion plants are a buttercup with a golden flower, large out of all proportion to the size of the plants ; a *Veronica* with straggling branches and many blossoms of ultramarine blue ; the prince of tree forget-me-nots—*Myosotis capitata*—its flowers a dark but most vivid blue ; gentians, their petals marked with purple lines or lilac, white and even crimson ; a *Celmisia*, which forms close mats of small stiff rosettes of glistening leaves, not unlike highly polished greenstone and with flower heads the size of a shilling, purple in the middle and with pure white ray florets. Occasionally individuals may be met with whose flowers are purple throughout, and such would be an acquisition to any rock garden. There is a member of the lily family with very fine orange-coloured blooms, densely set on a succulent stalk, and which although beautiful enough individually becomes still more worthy of admiration when, in countless numbers, they light up a whole hillside. One especially pretty plant forms bright green and dense cushions, these in due season becoming snowy masses of whiteness from their numerous and close-set small blooms. There are other flowering plants which although not showy, are, for different reasons, of much interest. *Cotula plumosa*, a species with bright green, elegant, feathery leaves, occurs also on the far-distant Crozet Islands. There is a species of plantain peculiar to Auckland Island on the high mountains, and yet another which forms small rosettes on the rocky shores. A bright green cushion plant of the pink family of most dense habit grows on the coastal rocks of all the New Zealand sub-antarctic islands, but is found nowhere else. A tall and handsome groundsel occurs on Antipodes Island alone, and there only on the ground manured by the netty.

"The most common plant association of the Auckland Islands—it occurs in Campbell Island also—is a meadow consisting of a large tussock-grass called *Danthonia bromoides*, which puts one much in mind of the snow-grass meadows of the southern alps of New Zealand. But here all resemblance ends. Burn the *Danthonia* tussock and it does not come up again. Frequently,

too, it is mixed with certain shrubs which grow with interlaced branches, and the presence of these in conjunction with the boggy nature of the ground and the many hollows it contains makes progress through such a meadow a quite laborious business.

"Between the tussock and the forest is the scrub, a plant-association of astounding density, which character is furnished chiefly by the shrub before-mentioned with wiry interlacing branches of *Suttonia divaricata*. You can walk on its top, you can roll over it, but usually you can no more burst through it than through a thick gorse hedge.

"The most important and peculiar characteristic of the sub-antarctic plants is their capacity for rapidly turning into peat, a phenomenon directly in harmony with the climate. So strong is this tendency that many are forming peat in their lower portions and growing above with vigour, the living part putting forth roots and subsisting on its own dead remains. So do the *Danthonia* and *Poa* grasses build up trunks, and some of the smaller plants cushions. Everywhere is a soil of peat. Even on the faces of the perpendicular cliffs several feet of peat may have accumulated and become occupied by two species of ferns with thick and dark-green leaves.

"Ferns, as elsewhere in the New Zealand biological area, are a feature of the sub-antarctic islands. Delicate translucent filmy ferns abound in the rata forest, and even form colonies many yards in extent on the wet upland meadows. The commonest fern, *Polystichum vestitum*, contrary to its usual habit, has frequently a stout trunk. More interesting is the fact, that in the neighbourhood of Norman's Inlet grows a true tree fern, the most southerly plant of its class upon the earth! A tiny polypody, hardly the length of one's little fingernail, clothes portions of the rock summits, both in the Aucklands and Campbells, while just emerging from the rocky ground at the time of our visit was an old acquaintance common in similar stations in the Southern Alps and even on Mount Egmont, one of the few New Zealand ferns whose leaves die down to the ground in winter.

"The scenery of the sub-antarctic islands as a whole exhibits both beauty and grandeur. Buffeted continually by the waves of a vast and stormy ocean, the coasts are rugged and precipitous. The view from the summit of the western precipices of Auckland Island is sublime. Black basaltic cliffs descend in places so abruptly to the sea for 1,800 feet that a stone could easily be dropped from summit to base. Precipitous knife-like razorbacks separating wedge-shaped openings in the cliff occur at more or less regular intervals along the whole of this iron and inhospitable coast-line. On the day the botanists visited the spot the sea was unusually calm; no white-crested waves were visible save on the fringe of rocks at the cliff's base, and yet the thunder of the breakers continually burst upon the ear. Near by a waterfall fell in glistening silver over the cliff, only to be returned as snake-like spray, nor ever reached its goal, the sea. A short distance to the west lay Disappointment Island, that most inhospitable of spots where the shipwrecked crew of the Dundonald so heroically faced privation and finally conquered Nature in her most adverse mood.

2. A Sea Shore Meadow.

3. Prostrate 'Rata'—*Metrosideros lucida.*

To face page 248.

4. Disappointment Island.

5. *Stilbocarpa polaris.*

To face page 249

"Carnley Harbour shows scenes of a more peaceful beauty, though when her waters are lashed by the furious winds and the roar of storm is everywhere, while grey mists sweep over the mountains, it is gloomy enough. But on a bright day with the land-locked waters glistening in the sunshine, the brown hills, and the forest of varied greens, the aspect is truly beautiful, and may well challenge comparison with the lakes of Scotland."

Explanation of the Plates.

1. Tussock grass (*Poa litorosa*) with *Olearia Lyallii* in the background. Dr. Cockayne is standing on the left of the tussocks.
2. A sea shore meadow, shewing *Pleurophyllum criniferum* with a foreground of *Ligusticum latifolium* on the left and some leaves of *Stilbocarpa polaris*, on the right *Ligusticum* with *Poa foliosa*.
3. Prostrate 'rata' (*Metrosideros lucida*) on Auckland Island.
4. Disappointment Island shewing the huts built by the castaways. The N.W. Cape of Auckland Island in the distance.
   In the foreground plants of *Bulbinella Rossii*.
5. *Stilbocarpa polaris*.

The photographs were taken by Capt. A. A. Dorrien-Smith.

XXXII.—DECADES KEWENSES

Plantarum Novarum in Herbario Horti Regii Conservatarum.

DECAS L.

491. **Asterophorum**, *Sprague*, gen. nov. [Tiliaceae—Brownlowieae]; peraffinis *Christianae*, DC., a qua carpellis fructus connatis differt.

Flores unisexuales, ut videtur monoici, masculi tantum visi. *Calyx* campanulatus, lobatus. *Petala* 5, imbricata. *Stamina* numerosa, centralia, omnia fertilia, filamentis inferne connatis. *Capsula* 5-locularis, loculicida, loculis 1-spermis, valvis in apicibus carpophori stellati suspensis. *Endospermium* carnosum. *Embryo* cotyledonibus foliaceis, radicula exserta.

Asterophorum eburneum, *Sprague* (species unica).

Arbor subramosa, 4·5 m. alta (teste *Spruce*). *Rami* striolati, primum stellato-pubescentes, mox glabrescentes. *Folia* oblongo-ovata, basi rotundata vel subtruncata, apice obtusiuscule acuminata, 12–25 cm. longa, 6–10 cm. lata, utrinque satis inconspicue subtiliter reticulata, supra in nervis stellato-pubescentia vel puberula, ceterum glabrescentia, subtus minute puberula et lepidota; nervi laterales utrinque 8–10; petioli 3·5–7 cm. longi. *Stipulae* subulatae, 1–5 mm. longae, caducae. *Pedunculi* 5·5–6·5 cm. longi, ramis circiter 4. *Flores masculi* in apicibus ramorum rhachis umbellati, eburnei et odorati (teste *Spruce*), pedicellis 4–5 mm. longis. *Calyx* 4·5 mm. longus, trilobatus, extra stellato-tomentellus, intra glaber, lobis deltoideis 1·5–2 mm. longis. *Petal* oblanceolata, rotundata, 7 mm. longa, 2–2·5 mm. lata,

glabra. *Stamina* 32–34, filamentis usque ad 6 mm. longis inferne connatis, exterioribus brevioribus, antherarum thecis apice contiguis deorsum divergentibus. *Capsula* subturbinata, obtuse 5-angulata, apice leviter depressa, 1·5–2·3 cm. longa, 1·7–2 cm. diametro, extra dense stellato-pubescens, endocarpio crustaceo fulvo nitidulo tandem soluto. *Semina* ovoideo-globosa, cinerea, brunneo-variegata, 6–7 mm. diametro.

Ecuador. Chonana near Guayaquil, *Spruce*, 6260.

Asterophorum has the floral characters of *Christiana* and the fruit of *Pityranthe*. The fruit of *Christiana* consists of several (five or fewer) free follicles, and *Asterophorum* must therefore be regarded as generically distinct from it, in spite of the great resemblance in habit and floral characters. The carpels of *Christiana* at the time of flowering are united to one another by the lower part of the ovaries only; owing to the interlocking of the long hairs with which they are clothed, however, the whole of the ovaries and the lower part of the styles appear, on superficial examination, to be connate.

Speirostyla, Baker (Sterculiaceae), is identical with *Christiana*, and *S. tiliaefolia*, Baker, is *Christiana madagascariensis*, Baill. Both authors, indeed, quote Hildebrandt, 3262, as a type specimen. Baker (Journ. Linn. Soc. vol. xxv., p. 299), when describing *Speirostyla*, wrote "This seems to have quite as good a right to be placed in Tiliaceae as in Sterculiaceae," and Schumann subsequently placed it in Tiliaceae beside *Christiana*, from which he distinguished it by the stigmas (Engl. & Prantl, Nat. Pflanz. Nachtr. 1, p. 233). There is no essential difference between the stigmas of *Speirostyla* and *Christiana*, however, the actual form being intermediate between the figures in Martius, Fl. Bras. vol. xii., pars. 3, t. 25, and Journ. Linn. Soc. vol. xxv. t. 50. Baillon, Hist. Pl. Madag. t. 81 is an excellent figure. The description and figure of *Speirostyla* are somewhat misleading, the carpels being in reality free from one another except at the base, and the ovules being solitary in each cell, as indeed they are shown in the figure. The number of carpels varies from five to seven, according to Baillon.

492. **Derris Hanceii**, *Hemsl.* [Leguminosae-Dalbergieae], in Bot. Mag. ad tab. 8008, absque descriptione plena et habitatione; species *D. oblongae*, Benth., similis, ab ea tamen foliolis paucioribus et calyce extra glabro differt.

Frutex scandens, fere undique glaber. *Folia* graciliter petiolata, 5–9-foliolata; foliola petiolulata, tenuia, oblongo-obovata, 5-7 cm. longa, obtusa, subtus pallidiora, venis ultimis minutissime reticulatis. *Flores* iis *D. alborubrae* similes, in paniculas angustas laterales 7–12 cm. longas suberectas dispositi; pedicelli graciles, quam flores breviores. *Calyx* fere truncatus, intus pubescens. *Petala* unguiculata; vexillum complicatum, lamina basi bicristata; alae apice ciliolatae. *Ovarium* hirsutum, 2-ovulatum; stylo stamina aequans. *Legumen* (immaturum tantum visum) planum, circiter 4 cm. longum, coriaceum, glabrum, monospermum (an semper?) ovale, utrinque attenuatum, apice acutum, suturis anguste alatis.—*Derris oblonga*, Hance in Journ. Bot. 1879, p. 10, non Benth.

China. Kwangtung; among rocks on the muddy banks of the Canton River, *T. Sampson*; Shing-hing Pass, West River, *C. Ford.*

493. **Philadelphus madrensis**, *Hemsl.* [Saxifragaceae-Hydrangeae]; species *P. microphyllo* proxima, differt ramulis floriferis elongatis, foliis subtus sericeo-pilosis apiculatis, floribus minoribus et calyce extra dense tomentoso.

Frutex ramis floriferis gracillimis valde elongatis rubris striatis parce pilosulis apice 1–3-floris. *Folia* subsessilia, tenuia, ovata, 1·5–3·5 cm. longa, acuta, apiculata, basi rotundata, semper integra, subtrinervia, subtus dense sericeo-pilosa, alba, supra parce pilosula, demum glabrescentia, in axillis coma densa pilorum brevium alborum instructa. *Flores* tetrameri, circita, 2–5 cm. diametro, saepius solitarii, previter pedicellati. *Calyx* extra intusque hirsutus; lobi crassi, ovati, circiter 0·5 cm. longi, apiculato-acuminati. *Petala* alba, ovata, 1 cm. longa, apice rotundata, basi lata. *Stamina* circiter 32, inaequalia, longiora 6–7 mm. longa, filamentis in phalanges 4 plus minusve connatis. *Ovarium* apice glabrum vel pilis paucissimis instructum; styli glabri, ad medium connati.—*P. mexicanus*. Seem. Bot. Voy. Herald, p. 294, et. Hemsl. in Biol. Centr. Am., Bot., vol. i. p. 384, pro parte, non Schlecht.

Mexico. Sierra Madre, Durango, *Seemann*, 2167.

494. **Begonia (Knesebeckia) dichroa**, *Sprague* [Begoniaceae]; species distincta, nullae adhuc cognitae proxima, floribus femineis bicoloribus.

Planta elata, glabra, pilis minutis moniliformibus glandulosis in innovationes et inflorescentiam adspersis exceptis. *Folia* plantae juvenilis rhomboideo-elliptica, semicordata, acuminata, 10–12 cm. longa, 5–5·5 cm. lata, albo-maculata; folia in planta adulta sub anthesi incipiente provenientia ovata-oblonga, apice longe acute acuminata, basi valde obliqua, semicordata, 8-nervia, superne nervis utrinque 3–4 penninervia, 22 cm. longa, 9–11 cm. lata, margine leviter undulata, supra saturate viridia, nitidula, subtus pallida; petioli 2–2·5 cm. longi. *Stipulae* ovatae, acute acuminatae, 2·5 cm. longae, 1·5 cm. latae. *Pedunculus* 3 cm. longus, dichasium gradus quarti gerens, floribus masculis terminalibus, femineis axillaribus. *Bracteae* cymbiformes, in statu explanata ovatae, obtusae, 1–1·5 cm. longae, 0·8–1 cm. latae, ut rhachis coccineo-tinctae. *Flores masculi* pedicellis circiter 2 cm. longis. *Perianthii segmenta* 4, coccinea, 2 exteriora late obovata, obtusa, 2·3 cm. longa, 1·9 cm. lata, 2 interiora oblanceolata, rotundata, 1·2 cm. longa, 4·5 mm. lata. *Stamina* in toro convexo 1·5 mm. alto insidentia, filamentis 2–3 mm. longis, antheris vix 1·5 mm. longis, loculis versus basin convergentibus. *Flores feminei* sessiles vel breviter pedicellati. *Perianthii segmenta* coccinea, 5, quorum 2 exteriora late obovata, obtusa, 14 mm. longa, 11 mm. lata, intimum oblongum, rotundatum, 7–8 mm. longum, vix 4 mm. latum, cetera 2 intermedia. *Ovarium* 3-loculare, 1·5 cm. longum, album, alis 6–7 mm. latis, placentis bipartitis undique ovuliferis. *Styli* basi brevissime connati, 3-3·5 mm. longi,

bifurcati, ramis vix ultra 1 mm. longis in helicem sesquicyclicam tortis, papillis externe infra furcam continuis ramos spiraliter ascendentibus.

Brazil. Described from fresh material communicated by Messrs. Haage & Schmidt, Erfurt. Very similar in habit to *B. maculata*, Raddi, which belongs, however, to a different section of the genus, in which the two segments of the placenta bear ovules on their outer faces only. The two species look remarkably alike when not in flower, the most obvious difference being that the leaves of *B. dichroa* are considerably less oblique than those of *B. maculata*.

495. **Pedicularis Komarowii**, *Bonati* [Scrophulariaceae-Euphrasieae]; species sectionis Myriophyllarum, *P. binariae*, Maxim. affinis; ab illa differt scapis ramosis, foliis amplioribus, tubo calycem vix superante, extra illo recurvato, dentibus calycis linearibus, vix incisis tubum aequantibus, rostro erecto partem inferiorem galeae paralleliter sequente et filamentis glabris.

Radix turbinata. *Scapi* multi, erecti, 8–15 cm. alti, plus minusve ramosi, ramis brevibus cylindricis glabris vel ad superiorem partem linealiter e margine petioli pilosis. *Folia* radicalia evanida; caulina opposita, pauca, longe petiolata (circa 10–14 mm.); limbus lineato-lanceolatus, 1–4 cm. longus, pinnatisectus; lobi 6–8-jugi, lineato-acuti, profunde dentati, distantes, sessiles, basi late decurrentes. *Bracteae* verticillatae, basi membranaceae, dilatatae, semi-amplexicaules, summo foliiformes, superiores fere integrae. *Flores* elegantes, purpurei, breve pedunculati (pedunculis 3–4 mm. longis glabris), in verticillos basi discretos summo propinquissimos conjuncti. *Calyx* campanulatus, ante non fissus; tubus 5–8 mm. longus, membranaceus, albidus, 10-nervatus (nervis eminentibus, haud reticulatis), in sulcis margineque villosus, summo profunde 5-dentatus; dente summo filiformi, integro lateralibus minore; illis lineato-lanceolatis tubum aequantibus superficialiter incisis margine ciliatis. *Tubus corollae* 5–6 mm. longus, rectus, extra calyce abrupte ac valde incurvatus. *Galea* obliqua, tubum superans, 12–10 mm. longa, margine integra, rectangula, in rostro recto, partem inferiorem galeae paralleliter sequentem (rostrum 2–3 mm. longum) abrupte terminatae; labium inferius galea duplo minus, sessile, superficialiter trilobatum; lobis lateralibus orbicularibus, medio valde minore, 2 mm. longo ac lato cucullato non eminente, omnibus lobis deuse margine ciliatis. *Filamenta* glabra. *Capsula* ac semina non visa.

Central Asia. Without locality, *Komarow*, 1893.

496. **Pedicularis pteridifolia**, *Bonati* [Scrophulariaceae-Euphrasieae]; species sectionis Bristium praecise definita, foliis radicalibus; *P. vaganti*, Hemsl., paulo affinis, ab illa differt scapo erecto nudo, rostro nullo, galeae margine ciliata, etc.

Radix verticalis cum fibris filiformibus, uni vel pluricaulis. *Scapi* glabri, simplices, erecti, 15–30 cm. alti, nudi, vel vix folia pauca bracteiformia alterna minutissima gerentes. *Folia* radicalia amplissima, 20–28 cm. longa (petiolis 5–9 cm.), pinnatissecta, lobis 7–9-jugis; lobi inter se distantes, oblongi, acuti, pinnatifidi, 30–35 mm. longi, 10–15 mm. lati, sessiles, basi decurrentes,

Bracteae inferiores foliiformes, 2·3 cm. longae, superiores trisectae, lobis serratis. *Flores* 12–15 in spicam terminalem, brevissimam conjuncti, fere sessiles, lutei. *Calyx* glaber; tubus 5–6 mm. longus, ante non fissus, nervis 5 eminentibus, dentibus 5 parvulis 1 mm. longis integris filiformibus. *Corolla* 20–28 mm. longa; tubus erectus, glaber, calycem 3–4-plo superans; galea tubo duplo brevior, galeae *P. tristis*, L., similis, ante tamen paulo fissa, solum margine pilis albis ciliata; labium inferius breve (5–6 mm.) superficialiter trilobatum, lobis fere aequalibus, medio emarginato, omnibus margine dense ciliatis. *Stamina* corollae basi inserta, filamentis duobus villosis. *Capsula* ac semina non visa.

WESTERN CHINA. Mont Omi, *Wilson*, 5080, 4550.

497. **Pedicularis sparsiflora**, *Bonati* [Scrophulariaceae-Euphrasieae]; species *P. Petitmenginii* mihi affinis; ab illa differt pedunculis multo longioribus rigidioribus, filamentis villosis, labio ciliato, scapis fistulosis erectis, etc.

Scapus erectus vel adscendens, circa 40 cm. altus, crassus, fistulosus, plus minusve angulosus, pilis albis brevibus ac crispis in sulcis praeditus. *Folia* caulina alterna, petiolata (petiolis 1–2 cm. longis); limbus ovato-oblongus, 4–10 cm. longus, pinnatisectus, lobis 16–20 distantibus sessilibus basi decurrentibus profunde incisis, dentibus acutis glabris vel vix pilis crispis sparsisque additis. *Bracteae* foliiformes, petiolulatae. *Flores* omnes axillares, longissime pedunculati; pedunculis glabris erectis folia aequantibus. *Calyx* villosus, ante fissus, subspathaceus; tubus 5–7 mm. longus, nervis eminentibus, longe tridentatus (5 mm.), dentibus lateralibus basi filiformibus summo foliaceis; medio paulo minore longius stipitato, summo deltoideo superficialiter inciso. *Corolla* alba vel flavescens; tubus rectus, calycem vix superans; galea ac rostrum sicut apud *P. tortam*, Maxim; labium inferius 1 cm. longum, profunde trifidum, lobis orbicularibus subaequalibus margine ciliatis. *Stamina* fauce inserta; filamentis omnibus villosis. *Capsula?*

WESTERN CHINA. Without locality, *Wilson*, 4257 a.

498. **Sanchezia parvibracteata**, *Sprague et Hutchinson* [Acanthaceae]; affinis *S. nobili*, Hook. f., a qua petiolis exalatis, bracteis minoribus, floribus pro bractea paucioribus et staminodiis longioribus differt.

Planta erecta, pauciramosa, carnosa, glabra, circiter 1 m. alta. *Rami* obtuse tetragoni, fere 1 cm. diametro, purpurei, internodiis 3–5 cm. longis. *Folia* oblongo-elliptica, 12–24 cm. longa, 5–11 cm. lata, apice longiuscule acuminata, acuta vel obtusa, basi cuneata, repando-crenata, denticulis 5–10 mm. distantibus, venis ascendentibus utrinque 13–16 ut costa albidis inferioribus subrectis superioribus curvatis, petiolo usque ad 2·5 cm. longo haud vel superne tantum vix alato. *Inflorescentia* circiter 18 cm. longa, inferne leviter stricte ramosa. *Bracteae* late ovatae, usque ad 2 cm. longae et 1·5 cm. latae, 3–5-florae. *Bracteolae* obovato-oblongae, obscure 5-nerviae, 1·5–2 cm. longae. *Calycis segmenta* inaequalia, oblonga, obtusa, 2–2·5 cm. longa, 4–7 mm. lata, apice ciliolata, intus ut bracteae et bracteolae minutissime glanduloso-pilosa. *Corolla* tubulosa, in basin angustata, 5–5·3 cm. longa, lutea,

extra superne minute puberula, fauce 5 mm. diametro, lobis reflexis oblongis 5–7 mm. longis 3–4 mm. latis ciliolatis breviter bifidis. *Stamina* 1–1·3 cm. supra corollae basin inserta, filamentis 5·5–6 cm. longis sparse villosis, antheris 6–7 mm. longis hirsutis. *Staminodia* 3–3·3 cm. longa, apice subcapitata, sparse villosa. *Discus* 2 mm. altus. *Ovarium* 4–5 mm. longum, 3 mm. diametro, glabrum ; stylus circiter 7 cm. longus, inferne minute puberulus ; ovula 4–3 pro loculo.

Tropical America. Described from a plant cultivated at Kew, which was received from the Royal Botanic Gardens, Peradeniya, in 1905.

499. **Pogostemon (Paniculata) Championii**, *Prain* [Labiatae-Satureineae] ; species *P. pubescenti*, Benth., quam maxime affinis, verticillastris tamen haud subsecundis aliisque notis satis differt.

Suffrutex suberectus, parce ramosus. *Caules* ramique graciles, distincte sed obtuse 4-goni, parcius pubescentes. *Folia* ramisque opposita, decussata, membranacea, ovato-lanceolata, acuminata, basi cuneata, margine basi integro excepto minopere duplicato-crenata, supra praesertim secus nervos sparse appresse pubescentia, subtus secus nervos sparse appresse pubescentia ceterum glabra, 6–8 cm. longa, 2·5–4 cm. lata ; petioli 1–1·25 cm. longi, parce appresse pubescentes. *Verticillastri* in spicas simplices continuas ovato-cylindricas pedunculatas 1·5–3·5 cm. longas, 1 cm. latas aggregati, pedunculis appresse pubescentibus 5 mm. longis ; spicae laxius ad apices ramorum paniculatae ; bracteae ovato-lanceolatae, virides, 3 mm. longae, calyce breviores. *Calyx* anguste campanulatus, 4 mm. longus, extra pubescens, lobis triangulis acutis aequalibus tubo triplo brevioribus. *Corolla* pallide purpurea, 7 mm. longa, margine loborum parce ciliato-pubescente excepto glabra, lobis subaequalibus. *Filamenta* subadscendentia, barbata. *Styli* rami subaequales, 1·5 mm. longi. *Nuculae* late ovoideae, glabrae.—*P. parviflorus*, Benth. in Fl. Hongk., p. 275 ; Hemsl. in Journ. Linn. Soc., xxvi., p. 276, nec Benth. in Wall. Cat. Lith. n. 1531.

China. Hong Kong ; on Mount Parker, *Champion*, 339.

With the exception of *P. formosanus*, Oliv., a native of Formosa, this is the only *Pogostemon* as yet recorded from China ; even it has only once been collected. It does not bear a striking resemblance to *P. parviflorus* proper, though it is undoubtedly very closely allied to *P. parviflorus*, β *hispidus*, Benth. in DC. Prodr. xii., p. 152, a plant from Upper Assam, which has, with greater justice, though even then not altogether satisfactorily, been referred to *P. glaber* by Sir J. D. Hooker in the *Flora of British India*, vol. iv., p. 633. It bears an even more striking resemblance to *P. pubescens*, Benth. in DC. Prodr. xii., p. 152, a species which has been reduced to *P. parviflorus* in the *Flora of British India*, but which it seems more satisfactory to treat as distinct.

500. **Pogostemon (Paniculata) hispidus**, *Prain* [Labiatae-Satureineae] ; species *P. Championii* quam maxime affinis, bracteis tamen paullo majoribus, foliisque margine serratis satis differt.

Suffrutex erectus, ramosus 0·75–1 m. altus. *Caules* ramique robustiores, perobscure 4-goni, purpurascentes, parcius pubescentes. *Folia* ramique opposita, decussata, herbacea, ovata, acuta vel acuminata, basi cuneata, margine basi integro excepto duplicato-serrata, supra praesertim secus nervos sparse appresse pubescentia,

subtus secus nervos sparse appresse hispida ceterum glabra, 6–8 cm. longa, 3–5 cm. lata; petioli 1·5–2·5 cm. longi, sparse appresse hispidi. *Verticillastris* in spicas simplices vel parce ramosas plus minusve interruptas pedunculatas 1·5–4·5 cm. longas, 1 cm. latas aggregati, verticillastris inferioribus 6 mm., superioribus 1–2 mm. remotis, pedunculis appresse pubescentibus ·5–2 cm. longis; spicae ad apices ramorum laxe paniculatae; bracteae ovatae vel ovato-lanceolatae, saepe foliaceae, majores 8 mm. longae, 2·5–3 mm. latae. *Calyx* anguste campanulatus, 4 mm. longus, extra parce hispidus, lobis triangulis acutis aequalibus tubo triplo brevioribus. *Corolla* pallide lilacina, 7 mm. longa, glabra, lobis subaequalibus. *Filamenta* lilacina, subadscendentia, barbata. *Styli* rami subaequales, 1·5 mm. longi. *Nuculae* late ovoideae, glabrae.—*P. parviflorus* var. *hispidus*, Benth. in DC. Prodr. xii., p. 152. *P. glaber*, Hook. f. in Flor. Brit. Ind. iv., p. 633 partim, nec Benth. *P. glaber*, var. *pubescens*, Hook. f. Mss. in Herb. Kew.

Assam. Upper Assam, *Jenkins* (type of *P. parviflorus* var. *hispidus*, Benth.; flowering spp.); *Jenkins* 346 (fruiting spp.) Khasia Hills; *Hooker & Thomson.* Jaintea Hills; Jowai, *Hooker & Thomson.* Burma: Shan States, *King's Collectors.*

Readily distinguished from *P. glaber* by its irregularly-toothed leaf-margins, its larger bracts and its interrupted spikes, and from *P. parviflorus* by its smaller leaves and much narrower spikes. It approaches *P. pubescens*, Benth., a Peninsular Indian species, more closely than it does either of the species mentioned, but is readily distinguished by its serrate, not crenate leaf-margins.

XXXIII.—GUAYULE RUBBER.

In the *Kew Bulletin* No. 7, 1907, p. 285, an account was given of the Guayule Rubber industry in Mexico. From the following despatch from His Majesty's Minister, Mexico, which has been received at Kew through the courtesy of the Secretary of State for Foreign Affairs, it would appear that the commercial importance of the Guayule plant will very shortly be a thing of the past.

His Majesty's Minister, Mexico, to The Secretary of State for Foreign Affairs.

Mexico.
Sir, May 19th, 1908.

With reference to my Despatch of this Series No. 52 of December 3rd, 1906, and to later Despatches on the subject of Guayule (rubber) in Mexico, I have the honour to report that an American expert, who has been spending some time in this Republic in an exhaustive study of the Guayule industry has made the following pronouncement, which I hear from other sources is a fairly correct statement:—

"Based upon a conservative estimate there are only about 400,000 tons of guayule now in existence, either standing in its native soil, or at the plants, or on the way to the plants for extraction.

"This scarcity has become so marked that the most remote sections or districts are now being scoured and searched for the plant, and what appears to be the last place where the shrub can be found in any quantity, the Bolson de Mapimi district, is being thoroughly gone over and the guayule gathered and delivered under contract to the Continental Rubber Company of Mexico.

"This district, which lies between the Sierra Mojada and Torreon, is practically the last remaining district where there is guayule in any considerable quantity, all the other sections having been pretty well cleaned up and the remainder of the 400,000 tons has long since been purchased by the various extracting companies at prices ranging from $25 to $75 per ton (£2 10s. to £7 10s.).

"The purchases at the lower prices were made before the land-owners realized the value of the shrub, or entertained the slightest suspicion that the plant would not reproduce itself in a very short time.

"On account of the extremely slow-growing habits of the shrub this has been found to be improbable, and it is a practical certainty that with the consumption of the existing supply of 400,000 tons above mentioned, the guayule industry will go into decay.

"It had been hoped that experiments would be made by parties interested in the production, planting of seed and joining it with some kindred plant to accelerate its growth so that a wait of but four or five years would be necessary for the plant to obtain the proper size for extraction. This could be effected by grafting the guayule upon some kindred plant the roots of which would furnish the guayule tops with a greater flow of sap and consequently a more rapid growth than its own roots would furnish.

"Whether this can be successfully done or not remains to be seen, and has never, so far as I know, been attempted.

"In this grafting, however, is the only hope for the future of the guayule industry, as it is said the opinion of eminent botanists in the United States has been that the plants of two feet in height now being extracted have required seventy years for their growth.

"So far no reports have been made that any of the experiments which have been tried hold out any encouragement or prospect of success of reproduction, and it is more than likely that unless the grafting as described be tried and found successful the end of the industry will come when the present supply of guayule is exhausted. The mills will then be turned to some other use and the machinery dismantled or turned to the extraction of fibre or other similar uses.

"The flora of Mexico is, however, so varied, interesting, and so entirely unknown, that the untiring work of the chemist is likely at any time to discover possibilities in some of these plants that will make the guayule industry appear of trifling significance."

I have etc.,

(Signed) REGINALD TOWER.

XXXIV.—DIAGNOSES AFRICANAE: XXIII.

Erratum.—In Diagnoses Africanae, XXII., *Kew Bulletin*, No. 5, p. 219, for 920, read 920 (bis).

940. **Triplochiton utile**, *Sprague* [Sterculiaceae]; a ceteris speciebus foliolis integris recedit.

Arbor magna. *Ramulus* unicus visus subangulatus, minute lepidotus, 3–5 mm. diametro. *Folio* integra, petiolis 1·5–6 cm. longis apice rugoso-incrassatis; lamina elliptico-oblonga, basi obtuse cuneata, apice longiuscule acute acuminata, 12–22 cm. longa, 5·5–9 cm. lata, supra opaca, sublaevis, creberrime reticulata ope lentis validae visa, nervo medio acuto prominente, subtus densissime minute lepidota, lepidibus dense ciliatis, nervo medio et lateralibus prominentibus, venulis quam in facie superiore multo laxius reticulatis. *Fructus* siccus, monospermus, antice in alam ascendentem more *Acridocarpi* productus, dense lepidotus; corpus fructus plano-convexum, cymbiforme, 2·5–3 cm. longum, 1·2–1·5 cm. latum, facie ventrali subplano valde costato, costa superne secundum alam producta; ala 7–8 cm. longa, medio circiter 3 cm. lata, margine superiore subrecto, inferiore convexe arcuato in basin corporis angustato. *Semen* ab angulo superiore pendulum, circiter 2·5 cm. longum, 1·2 cm. latum, testa papyracea, hilo sublineari utrinque angustato 6–7 mm. longo, radicula supera. *Endospermium* superne radiculam exsertam 3 mm. longam involvens, ceterum bipartitum, segmentis plano-convexis. *Cotyledones* foliaceae, nervosae, endospermio aequilongae et aequilatae apice seminis excepto.

West Tropical Africa. Gold Coast; Hunisu, *H. N. Thompson*, 1.

The timber of this tree is exported to Europe as "Mahogany," according to Mr. Thompson. Until flowers are known, the systematic position of *T. utile* must remain a little doubtful; the fruit, however, agrees fairly well with that of *Triplochiton*, and the difference in the leaves is no greater than is found among the species of *Sterculia*. Native name "Nyankom."

941. **Pseudocedrela cylindrica**, *Sprague* [Meliaceae]; affinis *P excelsae*, Dawe et Sprague, a qua foliolis pluries minoribus supra pulchre reticulatis, fructibus perfectius cylindricis recedit.

Arbor magna. *Ramulus* unicus tantum visus valde acute angulato-costatus, minute puberulus, costis superne in bases foliorum incurrentibus. *Folia* 20–35 cm. longa, 7–9-juga, rhachi inferne pubescente ibique supra plana, superne minute puberula; foliola 1·5–3 cm. distantia, petiolulis 1–2 mm. longis, oblique oblonga, latere superiore majore, 4·5–9 cm. longa, 2·5–4 cm. lata, basi valde inaequilateralia, apice breviter acute acuminata vel apiculata, supra nitidula venulis prominentibus crebre reticulata, subtus nervo medio et lateralibus prominentibus, venulis minus conspicuis quam in facie superiore; nervi laterales utrinque 7–9 satis obliquis. *Capsula* matura fere perfecte cylindrica, utrinque rotundata, 13–16 cm. longa, valvis lenticellosis medio circiter 2·5 cm. latis, intus nitidulis colore obscuriore variegatis seminum

impressionibus distincte notatis tandem in laminas duas findentibus; columna centralis circiter 2 cm. supra semina suprema producta, basi obtusissima. *Semina* 4–6 pro loculo, perfecta non visa.

West Tropical Africa. Gold Coast, near Mansu and Supom, *H. N. Thompson*, 16.

Timber exported to Europe as "West African Cedar," according to Mr. Thompson. Native name "Penkwa."

942. **Xylia Evansii**, *Hutchinson* [Leguminosae-Adenantherae]; affinis *X. africanae*, Harms, sed pinnis 13–16-jugis et foliolis basi subcordatis vel rotundatis differt.

Arbor circiter 24 m. alta (teste *Evans*), ramulis subteretibus circiter 5 mm. diametro glabris vel brunneo-puberulis. *Folia* petiolata, bipinnata, pinnis unijugis, petiolis 1·5–4 cm. longis apice glandula magna ornatis ut pinnarum rachi supra canaliculatis breviter brunneo-pubescentibus, rhachi 10–24 cm. longa; foliola 13–16-juga, opposita, oblongo-lanceolata vel oblongo-elliptica, acute vel obtuse longeque acuminata, basi rotundata vel subcordata, 3–7 cm. longa, 1–2 cm. lata, supra glabra, subtus brevissime tomentosa, nervis lateralibus utrinque 9–12 arcuatis supra inconspicuis leviter impressis subtus elevatis, venis inconspicuis. *Capitula* axillaria, solitaria vel geminata, multiflora, pedunculis 3–6 cm. longis breviter brunneo-pubescentibus. *Bracteolae* 2·5 mm. longae, in apicem obtriangularem dilatatae, parce pilosae. *Calycis tubus* anguste cylindricus, 5-lobus, 3–3·5 mm. longus, ut lobi extus fulvo-tomentosus, lobis triangularibus obtusis 1–1·5 mm. longis basi 0·75 mm. latis. *Petala* lineari-oblonga, obtusa, 4 mm. longa, 0·5–0·75 mm. lata, extus fulvo-pilosa, intus glabra. *Stamina* 10, filamentis glabris 5–6 mm. longis, antheris 0·5 mm. longis apice glandula decidua. *Ovarium* 1 mm. longum, longe pilosum. *Legumen* compressum, oblongum, subfalcatum, basin versus angustatum, apice rotundatum, lignosum, perdurum, circiter 20 cm. longum, medio 5 cm. latum. *Semina* 4, obovato-elliptica, 2 cm. longa, 1·3–1·5 cm. lata, nitida.

West Tropical Africa. Gold Coast, without precise locality, *Evans*, 13; Tano River, a medium-sized tree, *Thompson*, 15.

According to Mr. Evans this is a valuable timber tree yielding a very hard wood. The leaves are beaten up and used as soap by the natives.

943. **Kitchingia uniflora**, *Stapf* [Crassulaceae]; affinis *K. gracilipedi*, Baker, sed foliis brevissime petiolatis, floribus solitariis, et staminibus supra basin insertis distincta.

Herba humilis, caulibus prostratis e nodis radicantibus glabris. *Folia* obovata, obtusa, utrinque 1–2-crenata, 7–10 mm. longa, 6–7 mm. lata, carnosula, laete viridia; petioli crassiusculi, 1–2 mm. longi. *Flores* solitarii, terminales; pedicellus filiformis, patule pubescens, purpurascens, supra medium minute bibracteolatus. *Calyx* alte 4-fidus, segmentis late ovatis minute apiculatis, parce pubescens, 3–3·5 mm. altus. *Corolla* tubulosa, basin et os versus leviter constricta, 4-dentata, circiter 2–2·25 cm. longa, 7 mm diametro maximo, pulchre purpurea, glabra, dentibus late ovatis obtusiusculis. *Stamina* ad basin corollae inserta, epipetala paulo

altius orta, fere faucem attingentia. *Disci glandulae* lineari-oblongae, 2-dentatae. *Carpella* fere libera, sub anthesi conniventia, anguste lanceolata, 6–8 mm. longa; styli ad 12 mm. longi. *Folliculi* sursum divergentes, 8–9 mm. longi.

MADAGASCAR. The specimen from which this species is described was communicated by Mr. G. Bouvet, Director of the Jardin des Plantes at Angers. He writes that it was apparently introduced with other plants sent from Madagascar to Dr. Bontemps of Saumure in France.

944. **Begonia** (§ **Scutobegonia**) **modica**, *Stapf* [Begoniaceae]; valde affinis *B. calabaricae*, Stapf, sed foliis minime cordatis, ovarii alis superne latissimis (saltem duabus) et fructu igitur magis minusve obpyramidato distincta.

Herba subacaulis. *Foliorum petioli* 3–4 cm. longi, pallide rubescentes, albo-hirsuto-villosi; laminae oblique lateque peltato-ovatae, subacutae, 5–8 cm. longae, 4–6 cm. latae, leviter crenatae et undulatae, carnosulae, praeter margines obscure rubentes laete virides, supra glaberrimae, subtus in nervis primariis molliter hirsutae, nervis 6–8 radiantibus superne furcatis, umbone a sinu 1–1·5 cm. distante. *Pedunculi* pauciflori, 2–3 cm. longi, sparse pilosi. *Flores* terminales, umbellati, lutei, 2 masculi pedicellati, 1 femineus, subsessilis; bracteae oblongae, 4 mm. longae, fimbriato-incisae. *Flores masculi:* pedicelli ad 18 mm. longi, glabri; sepala 2, rotundato-elliptica, subaequalia, circiter 10 mm. longa, extus parce pilosa, superum extus magis minusve rubro-suffusum, intus basi maculo fere sanguineo ornatum, inferum utrinque sulphureum; petala 0; staminum 12–13 filamenta basi in columnam brevem connata, inferiora antheras aequantia, ultra 1 mm. longa, superiora brevissima. *Flos femineus:* pedicellus subnullus; sepala ut in masculis, sed suborbicularia; petala 0; styli 4, basi breviter connati, 2 lin. longi; stigmata reniformia, papillarum serie continua, 1·5 mm. lata; ovarium sub anthesi rubens, 9 mm. longum, 4–5 lin. latum alis inferne paulo angustatis parce ciliatis inclusis. *Fructus* maturus non visus.

WEST TROPICAL AFRICA. Gold Coast, on rocks, at 180 m., *J. Anderson* (Kumasi). Described from a plant in cultivation at Kew.

945. **Cyclocotyla**, *Stapf*, gen. nov. [Apocynaceae—Plumerioideae]; affinis *Craspidospermo*, Boj., sed calyce 5-lobo intus multiglanduloso basi annulatim incrassato una cum axi dilatata excavata cupulam crassam formante, disco ovarium cingente, et antheris linearibus longis distincta.

Calyx 5-lobus, basi annulatim incrassatus, una cum axi dilatata excavata in cupulam crassam fusus, lobis membranaceo-marginatis rotundatis intus glandulis numerosis squamiformibus stipatis. *Corolla* hypocrateriformis, tubo cylindrico carnosulo fauce esquamato; lobi 5, contorti, sinistrorsum obtegentes. *Stamina* supra basin inserta; antherae sessiles, lineares, tubum corollae fere aequantes, loculis basi inappendiculatis. Discus annuliformis. *Ovarium* integrum, 2-loculare; stylus superne leviter incrassatus; stigma cylindricum inter antherarum bases fovens; ovula 2-seriata, 5–6 in quoque loculo. *Fructus* ignotus.

C. congolensis, *Stapf* (species unica).

Frutex scandens, glabberrimus, laticiferus. *Folia* late oblonga vel obovato-oblonga, abrupte in acumen lineare obtusiusculum contracta, 8–9 cm. longa, 3·5–4 cm. lata, coriacea, costa tenui supra canaliculata, nervis lateralibus tenuibus fere angulo recto patentibus utrinque ultra 20 ; petioli 10–12 mm. longi. *Cymae* pauciflorae, in paniculam 4 cm. longam, 2 cm. latam terminalem dispositae ; bracteae latae, breves ; pedicelli crassiusculi, angulati, plerique 2 mm. longi, nonnulli 5 mm. attingentes. *Calyx* 2·5 mm. diametro, segmentis duplo latioribus quam longis. *Corollae* tubus ultra 5 mm. longus, 2 mm. diametro ; limbus (haud explanatus) ut videtur tubo multo brevior. *Antherae* 3·5 mm. longae.

Congo Free State. *L. Pynaert.*

The material from which the description was drawn up was communicated by Dr. E. De Wildeman who suspected in it a new genus. The name *Cyclocotyla* is intended to allude to the fleshy shallow cup (κοτύλη), formed by the base of the calyx and the widening of the floral axis, and the ring-shaped (κύκλος) swelling by which this cup presents itself when seen from without.

946. **Faroa Wellmanii**, *Prain* [Gentianaceae-Chironieae]; species ex affinitate *F. salutaris*, Welw., a qua caule more *F. graveolentis*, Bak,, ramosa, et pedicellis puberulis manifeste differt.

Herba erecta. *Caulis* glaber, 8–18 cm. altus, ramis axillaribus subpatentibus numerosis nonnunquam iterum ramosis 6–8 cm. longis. *Folia* glabra, opposita, lanceolata vel oblanceolata, subacuta, basi attenuata, 1–2 cm. longa, 3–6 mm. lata. *Flores* in glomerulas 4-6 terminales axillaresque 1·25–1·5 cm. latas 1–1·25 cm. remotas aggregati, foliis per paria subduti ; pedicelli minute appresse puberuli, 3–4 mm. longi. *Calyx* 2·5 mm. longus, segmentis erectis ovatis acutis submembranaceis, nervo mediano viridi subincrassato extus versus apicem carinato. *Corollae* tubus 2·5 mm. longus ; lobi 2 mm. longi, lanceolati, acuti. *Filamenta* corollae segmentis longiora. *Stylus* 3·5 mm. longus, filiformis, stigmate minutissime 2-lobo.

Portuguese West Africa. Benguella ; Bailundo District, 1500 m., *Wellman.*

947. **Warpuria**, *Stapf*, gen. nov. [Acanthaceae-Barlerieae] ; a *Crabbea*, cui proxima staminibus aequalibus dissitis, antherarum loculis aequalibus, floribus pedicellatis et bracteolis quasi calyce exteriore cinctis differt.

Calyx hyalinus, 5-partitus, segmentis angustis 5, posticis 3 fere ad basin distinctis, anticis 2 ad medium connatis, caeterum subaequalibus. *Corollae tubus* subcylindricus, ad vel paulo supra medium constrictus, rectus ; limbus minutus, imbricatus, lobis 5 rotundatis, lateralibus exterioribus, antico intimo, superioribus alte connatis. *Stamina* 4, aequalia, paulo supra medium corollae tubum inserta ; filamenta dissita ; antherae oblongo-sagittatae, dorsifixae, loculis aequalibus muticis ; pollinis grana sphaerica, reticulato-foveolata. *Discus* annularis. *Ovarium* 2-loculare, loculis 2-ovulatis ; stylus filiformis ; stigma 2-labiatum, labiis rotundatis, supero majore. *Capsula* oblonga, tertia parte summa in rostrum solidum magis minusve contracta; valvae inter

margines laeves induratos convexae, transverse rugosae et medio transverse constrictae. *Semina* 4, lenticularia, sericea, retinaculis fulta.—Herba perennis, humilis, a basi ramosa, ramis brevibus. Folia opposita, approximata, integra vel subintegra. Flores minuti, albi, in cymas densas multifloras bracteatas haud involucratas capituliformes longe pedunculatas axillares collecti, pedicellati, unusquisque bracteolis 4 sub-herbaceis hirsutis calyce longioribus involucratus.

W. clandestina, *Stapf* (species unica).

Planta ad 12 cm. alta, pilosa caule brevi prostrato vel ascendente. *Folia* opposita, approximata, petiolata, oblonga vel oblongo-lanceolata, utrinque acuta vel subacuta, 6–7 cm. longa, 2–3 cm. lata, obscure repando-denticulata vel integra, supra cystolithis granoso-scaberula, in costa dense in nervis sparse in parenchymate sparsissime pilis albis adpressis aspersa, secundum costam vita lata lobata nigro-viridi notata, caeterum laete viridia subtus cinereo-viridia, ad costam et secundum margines dense ad nervos laxius in parenchymate sparse pilosa, nervis lateralibus utrinque circiter 7 obliquis ; petiolus circiter 1 cm. longus, tomentosus. Pedunculi 5–8 cm. longi, pilis declinatis densis canescentes ; capitulum 1·5–2·5 cm. diametro, omnibus partibus albo-pilosis, bracteis 2 linearibus herbaceis 1–1·2 cm. longis, 1 mm. latis suffultum, bracteis aliis similibus sed minoribus cum pedicellis mixtis ; pedicelli inaequilongi, longiores 5 mm. attingentes ; bracteolae involucrantes exteriores oblongae, subito in acumen latiusculum obtusum viride contractae, ad 7 mm. longae, albidae vel virescentes, venosae, interiores lineares, lanceolatae, 5–6 mm. longae. *Calyx* 2·5–3 mm. longus, segmentis e basi triangulari subulatis apice saepe pilo terminatis. *Corolla* 5-6 mm. longa, extus ad os pilosa ; limbus minutus, clausus, vix 1 mm. altus, lobis rotundatis. *Antherae* albae, ultra 1 mm. longae. *Ovarium* apice pilosulum ; stylus magis minusve tortus. *Capsula* 7 mm. longa, fere 2–5 mm. lata. *Semina* 2 mm. diametro.

Madagascar. This remarkable little plant was raised at Kew in 1901 from seeds received from Mr. G. Warpur, who collected them in Madagascar. It has since flowered repeatedly at Kew and with Col. Beddome, but always produced cleistogamic flowers only which set freely.

948. **Selago nyikensis**, *Rolfe* [Selagineae] ; a *S. thyrsoidea*, Baker, foliis duplo minoribus et floribus multo minoribus differt.

Fruticulus compactus, 12–30 cm. altus. *Caules* puberuli, fastigiati, dense foliacei, ramosi. *Folia* oblongo-linearia, subobtusa, glabra, 8–12 mm. longa. *Spicae* breves, numerosae, ad apices ramorum dispositae, saepe congestae, densiflorae. *Bracteae* oblongae vel oblongo-lineares, obtusae, incurvae, 2–3 mm. longae, marginibus ciliatis. *Calyx* campanulatus, 5-partitus, villosus, 1·3 mm. longus ; lobi oblongi, subobtusi, ciliati. *Corollae* tubus oblongus, 1·5 mm. longus ; lobi inaequaliter orbiculari-oblongi, tubo aequales.

British Central Africa. Nyika Plateau, near Mwanemba, at 1950 m., *McClounie*, 39, "Flower blue" ; 40 "Flower white." September, 1902.

The two specimens cited are indistinguishable except in the colour of the flowers.

949. **Selago McClouniei**, *Rolfe* [Selagineae]; affinis *S. tenuicauli*, Rolfe; sed foliis paullo majoribus, minus pubescentibus et calycis lobis oblongis differt.

Fruticulus, 20–45 cm. altus. *Caules* pubescentes, foliacei, apice ramosi. *Folia* oblanceolata, subobtusa, prope apicem interdum denticulata, basi attenuata, 1–3 cm. longa, 2–5 mm. lata, puberula. *Cymae* corymbosae, densiflorae. *Bracteae* oblongae vel lanceolato-oblongae, subacutae, 2–2·5 mm. longae, marginibus interdum ciliatis. *Calyx* campanulatus, 5-fidus, 1·5 mm. longus; lobi oblongi, obtusi, ciliati. *Corollae* tubus oblongus, 1 mm. longus; lobi inaequaliter orbiculari-oblongi, tubo aequales. *Fructus* didymus, subglobosus, 1 mm. longus.

British Central Africa. Nymkowa, at 1950 m., *McClounie*, 57; Panda Peak, at 1500 m., *McClounie*, 139, September, 1902.

950. **Asplenium (Euasplenium) Elliottii**, *C. H. Wright* [Filices-Polypodiaceae]; *A. anisophyllo*, Kunze, affine, pinnis brevioribus latioribus subintegris differt.

Caudex non visus. *Stipites* 12 cm. longi, glabri, tenues, straminei. *Frondes* lanceolati, simpliciter pinnati, 28 cm. longi, 10 cm. lati; pinnae rhomboideae, acuminatae, minute crenulato-serratae, 5 cm. longae, 1·8 cm. latae, lamina superior basi truncata rhachide parallela, lamina inferior plus minusve obliqua; venae (infimis exceptis) unifurcatae; petiolulus ad 2 mm. longus. *Sori* 3–4 mm. longi.

British East Africa. Aberdare Range, at about 2800 m., *C. F. Elliott.*

The base of the lower side of the pinnae is much more obtuse than in *A. anisophyllum*, and is sometimes almost parallel to the rhachis.

XXXV.—TEO-NON, A NEW RUBBER TREE FROM TONKIN.

(*Bleekrodea tonkinensis*, Dub. & Eberh.).

Otto Stapf.

In the July number of last year of the *Bulletin Economique*, published by the Director of Agriculture, Forests and Commerce of Indo-China (pp. 576–585), Dr. Th. Eberhardt, Inspector of Agriculture, gave a detailed account of the occurrence of a valuable rubber tree in Tonkin, known to the Thôs people as "Teo-non." At the time it was not possible to define the systematic position of the plant beyond its affinity with *Ulmaceae*. Since then, however, it has been recognised as a member of the genus *Bleekrodea* (*Moraceae*) and has been described as *B. tonkinensis* by Dubard and Eberhardt in *Compt. Rend. Ac. d. Sc. Paris*, vol. CXIV., Oct. 1907, p. 631. The examination of a few branchlets of the plant, recently received at Kew from Dr. E. Perrot,

has confirmed the conclusions of the authors as to its affinity and specific distinction. The genus *Bleekrodea* has so far been known only from two species, one a native of Borneo (*B. insignis*, Bl.) and the other of North-West Madagascar (*B. madagascariensis*, Bl.). It has already been described by Blume as laticiferous, a character very general in *Moraceae*, but, so far as we know, there is no evidence of the presence of caoutchouc in the latex of the two species recorded by him. On the other hand, *B. tonkinensis* is stated to be very rich in caoutchouc and in this respect reminds us of another Moraceous genus, *Castilloa*.

The occurrence of a rubber-yielding tree in the forests of Tonkin was recorded as early as 1905 in a report by the commanding officer of the Cercle of That-Khe in the province of Bac-Kan. According to him it was known as 'May-ten-nong,' and attained a height of 10–12 m. with a diameter of 40 cm. The latex was abundant and was collected by the natives, whose attention seems to have been directed to the tree quite recently and accidentally; in fact they used it only as an admixture to increase the bulk of rubber collected from other sources. Last year, however, Dr. Eberhardt was commissioned to investigate the properties of the tree on the spot and the conditions under which it grows. The following is the essence of his report.

The tree occurs practically all over the province of Bac-Kan (north of Hanoi, and half way between this town and the Chinese frontier), and in the adjoining southern parts of the Cercles of Bao-lanc and Cao-bang; but Dr. Eberhardt is inclined to believe that it will be found throughout the mountainous districts to the north-west of the delta of the Red River and in the Laos country. In the province of Bac-Kan, it prefers hilly ground with a subsoil of calcareous schist and a deep covering of humus, which, however, must be fresh and well aerated and free from stagnant water. Where the soil is charged with clay, the 'teo-non' disappears completely, giving way to a vigorous growth of bamboos. It grows gregariously and may constitute as much as 40 per cent. of the vegetation. It is a rapid growing, much branched tree and attains a height of 12 to 15 m. The bark is thin and white, the wood white, soft and useless for joinery and carpentry. The mode of collecting the latex employed by the natives is very crude and wasteful. It consists in tapping the tree near its base by as many cuts as possible so that the normal flow of the latex is soon interrupted, whilst at the same time the tree is rapidly exhausted. Moreover, the product becomes in this way much contaminated with impurities. The latex is collected in the hollow joints of bamboos and carried to the nearest village or to some water-course where the contents are poured into a pot containing water which is then heated to boiling point. Thus treated it forms into cakes, the impurities nearly always gathering in the centre. There are two seasons for collecting the latex, one before, and the other towards the end of the rainy season. The natives, however, generally confine their efforts to the latter time, when the flow is much more abundant. This is due to the increased activity of the organism and to the presence of a greater quantity of water in the latex, so that finally the amount of caoutchouc obtained is after all not greater at the end than just before the beginning of the

wet season. Similarly the trees on the outskirts of a 'teo-non' wood yield less but more concentrated latex. At the end of May Dr. Eberhardt obtained from a single tree of 20 cm. in diameter as much as 480 grammes of latex; but he thinks that in the autumn this tree might well have yielded 600–650 grammes. He recommends tapping at the base of the trees as the latex taken from the young parts does not coagulate. In this respect the 'teo-non' behaves like *Ficus* and *Castilloa*.

Dr. Eberhardt obtained 676·6 grammes of caoutchouc per kilogramme (or 67·6 per cent.) from two litres of latex. The best method of inducing coagulation was by means of sulphuric and hydrochloric acids; acetic acid seems to impair the natural cohesiveness of the caoutchouc globules. Heating directly over fire results in an inferior product; as it has to be continued until the serum is completely evaporated when a succession of thin and tough skins is formed which do not adhere to each other. On the other hand, the hot water bath gives excellent results. The treatment with sulphuric acid, however, seems to be by far the best process and the caoutchouc thus obtained is of first-rate quality, very strong (nerveux), resistant and elastic. Mr. Cibot, an expert in American rubber and in the rubber industry generally, states that the 'teo-non' rubber is equivalent to Para and practically indistinguishable from it. A native-made cake of 'teo-non' rubber was, in fact, awarded a gold medal at the French Colonial Exhibition at Marseilles in 1906, in spite of the usual impurities present in the native article.

A score of young plants are at present in cultivation in the Botanic Garden at Hanoi. Only one member of the small subtribe *Fatoneae*, to which *Bleekrodea* belongs, has been found up to the present in India, viz.: *Pseudostreblus indica*, Bur., a small tree of the Khasia Hills; but between them and Tonkin, there must be many localities where the 'teo-non' could be grown with success if it should be found that its natural area does not extend into British territory.

The following description is based on the specimens received from Dr. Perrot, and supplemented from the description given by Messrs. Dubard and Eberhardt:—

A tree, 30–50 feet high, copiously branched, with whitish lenticellate bark and white wood; branchlets scaberulous from acute, white, rigid papillae. *Leaves* very polymorphic, obovate-oblong to oblanceolate or lanceolate, abruptly contracted into a slender acumen, 2½–6 lin. long, cuneate at the base, usually more or less dentate, sometimes with three coarse teeth on each side between the middle and the acumen, rarely almost entire, 2–6 ins. by ⅘–1½ ins., lateral nerves 5–10 on each side, curved, joined in loops within the margin, very slender, network of veins very loose; petioles slender, very scabrid from white rigid papillae, ¾–2 lin. long. *Flowers* monoecious, in small axillary, uni- or bi-sexual cymes; male cymes forming small compact globose clusters of 6–9 flowers, sessile or subsessile, bracteate; bracts and bractlets obtuse, the outer broad, the inner narrow, as long as or shorter than the subsessile flowers; female cymes subsessile or shortly peduncled, reduced to a female flower, embraced to the apex by two broad ovate or elliptic, obtuse, scaberulous, bracteoles,

situated in the median plane, and supported by two smaller alternating bracteoles, and a somewhat larger outer bract, with or without rudimentary male flowers in the axils of the inner bracts; mixed (bisexual cymes) like the male cymes, but with a female flower in the centre. *Male flowers:* perianth 4–5-lobed, lobes triangular-ovate, scarcely ½ lin. long; stamens 4–5, opposite the perianth-lobes; filaments inflexed in bud, rising elastically; anthers subglobose; ovary rudimentary, minute. *Female flowers:* perianth shortly ovoid-tubular, with a small almost truncate or minutely 4-toothed orifice, ½ lin. long, scaberulous; ovary subglobose; style sublateral; stigmas filiform, 3–3½ mm. long. *Fruit* (immature) of the size of a pea, formed of a one-seeded achene, surrounded by the fleshy enlarged perianth and supported by the equally enlarged bracteoles; embryo subglobose; cotyledons subequal, thick; radicle incumbent.

Of three branchlets received from Dr. Perrot, two possess only male clusters, the third only female cymes with or without rudiments of male flowers. Dr. Eberhardt, on the other hand, says that the male and female inflorescences alternate, whilst his and Dubard's description in the *Comptes Rendus*, l.c., admits male and mixed clusters on the same branch.

XXXVI.—MISCELLANEOUS NOTES.

Amherstia nobilis.—There is a good example of this handsome tropical tree in the Aroid house (No. 1) at Kew where it has been for at least 30 years. Until about 10 years ago it was planted in a tub, but since then it has been in the open border the soil in which receives a certain amount of heat from the boiler chamber immediately below. This plant is 25 feet high and has a stem 6 inches in diameter with loosely spreading branches. It has flowered more or less freely every year since it was planted out, and this year it has been exceptionally floriferous, carrying 82 large pendulous racemes of bright scarlet and yellow flowers which were at their best early in June. *Amherstia* was first introduced from Burma into English gardens through Chatsworth about 60 years ago, and was first flowered in a garden at Ealing in 1849. The Kew tree is probably about 40 years old. In Burma there are trees 40 to 50 feet high and when in flower they are said to be magnificent, and one of the features of the Royal Botanic Garden at Calcutta is an avenue of these trees. The flowers are used by the Burmese in connection with their religious ceremonies.

W. W.

Agaves at Kew.—The cultivated collection of Agaves at Kew is an exceptionally large one and there are nearly always some of them in flower. The tradition that *A. americana* the "American Aloe" flowers only once in a hundred years sometimes gives rise to excitement in the daily press when it is seen that some of these "century plants," as they are popularly termed, are in bloom at Kew, with the result that many visitors are disappointed when

they learn that the flowering of these plants is quite a common occurrence at the Royal Gardens. The age at which an *Agave* will flower depends largely upon the conditions under which it has grown; happily situated it may flower when 10 years old ; on the other hand, if the conditions are unfavourable to healthy quick growth, it may take 20, 50, or even a hundred years, or it may never flower at all. The species that have flowered at Kew this year are the following :—*A. Leopoldii*, flower spike 14 feet high ; *A. micrantha picta*, 2½ feet ; *A. horrida macrodonta*, 7½ feet ; *A. Polyacantha*, 4½ feet; *A. Bouchiei*, 2½ feet ; *A. densiflora*, 5 feet ; *A. Scolymus*, 8 feet ; *A. Haseloffii*, 3 feet.

W. W.

Presentations to Museums.—Among recent presentations to the Museums may be mentioned the following :—Roots of *Mesembryanthemum acutipetala*, used by natives of the Transvaal for the preparation of "Khadi," a fermented liquor ; received from Mr. J. Burtt Davy, Department of Agriculture, Transvaal.

Leaves of *Fagus obliqua*, *Aristotelia Macqui* (*Kew Bulletin*, No. 38, 1890, p. 34), and *Persea Lingue*, eaten by leaf-cutting bees in Chili ; presented by Mr. R. Morton Middleton, F.Z.S.

Branch of *Pinus muricata*, portion of stem and plank of *Pinus Coulteri*, planks of *Ailanthus glandulosa*, *Laburnum vulgare*, *Taxus baccata*, *Pinus Laricio and Quercus Robur*, also section of Oak in which a horse shoe has become embedded ; presented by Mr. H. Clinton Baker, Bayfordbury, Herts.

Section of a Beech log and portion of an Oak pile from the foundations of Winchester Cathedral. The former was taken from under Bishop de Lacy's work, A.D. 1202, and the latter was found under the early Norman work, A.D. 1079 ; received from the Very Rev. the Dean of Winchester through the kind offices of Mr. Francis Fox, C.E.

Photographs showing the effects of the storm upon the Lime and Horse Chestnut trees in Bushey Park on June 1st, 1908 ; from Mr. W. Haine, Teddington.

J. M. H.

Kapiti Island—The action of the New Zealand Government in setting apart areas throughout the length and breadth of the Colony for the protection of the native animal and plant life cannot be too highly commended. Their most important action, however, from the scientific point of view is the acquisition of three islands, which are to be maintained as sanctuaries for plants and animals. The three islands, which are of quite different character, are Little Barrier Island in the Hauraki Gulf, an island densely covered with forest similar to that of Northern Auckland ; Resolution Island, with a vegetation typical of the West Coast Sounds, with dense forest and high alpine flora not yet properly investigated ; and Kapiti Island which forms the subject of a very instructive and well-illustrated report recently presented by Dr. L. Cockayne to the New Zealand Government.

In its flora Kapiti Island is closely related to the neighbouring mainland of Wellington on the one hand and Marlborough on the other, but at the same time shews certain peculiar characteristics. The island has an area of 4,990 acres and on its western side it is one huge precipice rising to a height of as much as 1,700 feet above the sea. The steep slopes of the eastern side are covered with forest, and at the northern end there is an extensive boulder flat with a small fresh-water lagoon ; there are also numerous rivers. Kapiti has been a famous whaling station and various weeds have, in consequence, been introduced into the island ; moreover the whalers introduced goats, the descendants of which exist in great numbers. Then sheep farming was introduced, and sheep have pastured on the island for about 50 years. Between sheep and goats a great deal of destruction must have been done to native vegetation, and it is to be hoped that these and other introduced animals will be removed in order that the native fauna and flora may be left in undisputed possession of the island. The melancholy history of St. Helena should be a sufficient example of the irreparable destruction which may be caused to an indigenous flora by the introduction of foreign animals. Foreign weeds, too, appear to have modified the local flora of Kapiti to a considerable extent, but apparently the forest is free from such dangerous intruders as the Blackberry and Elderberry.

Dr. Cockayne devotes several pages of his report to descriptions of the various plant formations, which are well illustrated by the photographs, and he divides these formations into forest, coastal, shrubbery, meadow and rock. The forest is of the mixed type and in certain respects shows a coastal character ; it is composed of trees of low growth, which, however, possess definite trunks. The Karaka, *Corynocarpus laevigata ;* Mahoe, *Melicytus ramiflorus ;* Ngaio, *Myoporum laetum* and the Manaku, *Leptospermum scoparium*, largely determine the character of the forest and may be recognised by the characteristic tints of their different greens, which in October are lit up by the white masses of the flowers of the daisy-tree, *Olearia Cunninghamii.* The second tier in the forest, if present, usually consists of young trees of the same species as those composing the forest and not of distinct shrubs, which is somewhat unusual ; in places, however, various tree ferns and a few shrubs may be found, chief amongst which are the Tawa, *Beilschmiedia tawa*, and the northern Rata, *Metrosideros robusta.* The forest floor is frequently quite bare, a distinction from the New Zealand rain forest, but at other places, especially where the covering is less dense, there is a close carpeting of various ferns.

The leading plants of the forest are dealt with in detail, and the oecological factors and the general distribution of the species are also discussed.

The shrub formation is characterised by *Cassinia leptophylla* mixed with *Leptospermum scoparium* (Manaku) and *Olearia Solandri* in smaller quantity ; in the more open places various grasses are also to be found. The Manaku heath is one of the commonest of the New Zealand formations and might almost be classed as forest. In Kapiti it is continuous with the forest, and is an expression of the more stony nature of the ground and the less fertile soil. At the head of a small stream, the Tapeiro, in a very

wind-swept spot, a remarkable xerophytic scrub formed by *Nothopanax anomalum* is to be found. The bushes are from 2–4 feet high and so dense that one can stand upon them and, as they touch one another, a raised platform is formed of interlacing rigid stems whose apical portions have almost turned into spines. In places the lianes *Muehlenbeckia australis* and *Parsonsia heterophylla* are fairly abundant and help to bind the shrubs more closely together.

The other formations are also dealt with in considerable detail.

The flora of Kapiti consists of 218 species of flowering plants, ferns and fern allies, of which 43 belong to the two latter groups. It is characteristic of the central region of New Zealand being allied to the flora of the southern portion of the North Island and the northern portion of the South Island. The general affinities of the flora and the geological history of the island are also considered.

As a plant and animal sanctuary Kapiti appears to be peculiarly well suited, as, although it is of small extent, it is so much cut up by deep and precipitous gullies that a great part of the Island is very difficult of access. It is to be hoped that the whole of the island will be acquired by the Government so that it may become a safe home for the endemic fauna and flora of New Zealand, and that other New Zealand plants and trees, not already on the island, may also be introduced.

Dr. Cockayne's report concludes with a list of the indigenous plants with their English and Maori names together with notes on their distribution on Kapiti and in and beyond New Zealand.

In this connection of Flora and Fauna Reserves it is of interest to notice that the various scientific societies of South Australia are proposing to set apart 313 square miles of country at the western end of Kangaroo Island lying to the south of Spencer Gulf, and a short illustrated account of the island is given in "The Adelaide Observer" for February 1st, 1908.

Zapupe.—In *Der Tropenflanzer*, No. 4, April, 1908, Dr. Endlicher contributes an article on the 'Zapupe' cultivation in Mexico (*K.B.*, 1907, p. 396). From his observations it would appear that the 'Zapupe' of the Mexican littoral from Vera Cruz to Tampico is not derived from any single plant, and further the article leads to a conjecture that the sources of commercial 'Zapupe' as reported from the more southerly markets in the Vera Cruz tract may lie partly to the south of Vera Cruz, though this is not perfectly clear. In other words the term 'Zapupe,' like 'Istle,' may cover more than one staple, and the fibres that come into the coast markets under that title may be derived from different plants not necessarily all belonging to the *Agaveae*. In fact, it seems likely that the narrow-leaved 'Zapupe' plant, mentioned by Dr. Endlicher, may be a Bromeliad, unless it should turn out to be the long-sought *Agave cantala*, Roxb.

J. R. D.

"Die-back" of Peach Shoots.

[*To face page* 269.